

## **POLICY 1360.00 Systems Engineering Methodology**

Issued: June 4, 2009  
Revised: July 5, 2018  
Reviewed: October 27, 2020  
Next Review Date: October 27, 2021

### **APPLICATION**

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This policy is intended for statewide compliance and applies to all Executive Branch Departments, Agencies, Trusted Partners, Boards or Commissions using state of Michigan (SOM) information technology (IT) resources.

### **PURPOSE**

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This policy provides guidance for the development, enhancement and maintenance of new and existing IT systems with the SOM. It also outlines specific responsibilities for Agency Directors and the Director of Technology, Management and Budget.

### **CONTACT AGENCY**

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### **SUMMARY**

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The intent of this policy is to document the best practices that promote the development, enhancement and maintenance of reliable, cost-effective, computer-based solutions. Information systems play an essential role in delivering a variety of services to Michigan's citizens. The partnership between DTMB and its client agencies results in high quality and cost-effective automated solutions that meet a variety of public sector business needs.

The System Engineering Methodology (SEM) was created to assist the state of Michigan's government agencies in developing, enhancing and maintaining computer-based systems by establishing a consistent, structured systems engineering methodology.

This methodology provides guidance for DTMB managers and staff, including contracted resources, as well as other agency managers and staff that function as partners with DTMB. It is sufficiently flexible to cover both new projects and maintenance activities of all sizes.

Systems Engineering Methodology (SEM) consists of six components: the full SEM, SEM Express (for small, straightforward projects), maintenance activities, the SEM forms, SEM Process Guides and the SEM Systems Maintenance Guidebook. This methodology describes the System Development Life Cycle and specifies the roles and responsibilities of the participants in each stage of the life cycle.

For specific guidance, see the public facing [Systems Engineering Methodology](http://www.michigan.gov/suite) (<http://www.michigan.gov/suite>) Internet website.

Additional information and training opportunities can be found on the state internal [Systems Engineering Methodology](http://www.michigan.gov/suite) (<http://www.michigan.gov/suite>) Intranet.

## **POLICY**

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DTMB and its client agencies are required to follow SEM for all IT projects.

### **Agency Director**

As a System Owner, the Director within their area of responsibility shall ensure:

- A business case for each proposed project, including identification of benefits of completing the project or the risks of not completing the project.
- Alignment to agency goals.
- Appropriate funding for each proposed project.
- Executive sponsorship for each proposed project.
- Availability of sufficient and knowledgeable resources, including subject matter experts (SME), testers, policy experts and trainers.
- As owners of the data, the data is correctly categorized, particularly for personally identifying information (PII), bank or credit card information and other confidential information.
- Availability of resources authorized to test, approve and accept project deliverables.
- Availability of individual(s) to act as application system owner(s). An application system owner has ultimate responsibility for a system and is responsible for gathering information and providing management recommendations on the resources required to meet operational objectives. It is understood that no one person can know all the details of a system and its operations. Therefore some of the following responsibilities may be delegated:
  - Learn and understand the overall purpose of the system.
  - Learn and understand sufficient details of the system to be able to manage the day-to-day business operations of the system.
  - Manage the development and continued maintenance of desk procedures for business staff that operate the system on a day-to-day basis.
  - Make final decisions in situations where system information is inaccurate after appraising the customer impact as well as the resources and time available.
  - Provide final approval for implementation for all changes to the system.

- Recommend improvements to the system to maintain an efficient and accurate business process providing customer oriented information.
- Develop and maintain a system business continuity plan, including business operating procedures (for more detail see Administrative Guide Policy 1340 Information Technology Information Security Policy, Section 070 Contingency Planning (CP) and SOM 1340.00.070.02 Information Technology Continuity of Business Planning Standard).
- Conduct periodic review of the system operations to insure they are working as intended.
- Conduct periodic review of the data to ensure it is accurate.
- Coordinate periodic reviews to ensure acceptable levels of documentation – including audits and controls to ensure data integrity – and procedures for operating and maintaining the system.
- Establish and maintain business processes.
- Develop specifications for what the system will and will not do (including reporting).
- Ensure there are a policy and process for granting access to the system and a process for periodic review of the access.
- Oversee the administration of training development and presentation for all staff that will update or use the information in the system.
- Ensure applications are secure; that personal and confidential data is protected; and that risk assessment is completed to identify vulnerabilities in the system.

### **DTMB Director**

As a System Developer, the Director shall ensure:

- Agencies are provided with a governance team:
  - To which project and operational metrics are provided.
  - Through which decisions about the project or system – escalated issues – can be resolved.
- Agencies are provided information and recommendations about the best technical approaches to meet business needs.
- Agencies are provided reliable and cost-effective technical solutions by researching the applicability of commercial off the shelf (COTS) solutions and other shared IT solutions.
- Agencies are provided with a budget, including total cost of ownership of the IT product.

- A mechanism is in place to collect, track and mitigate and/or resolve application and hardware vulnerabilities.
- Appropriate problem resolution has occurred and that system issues are addressed and communicated accordingly.
- Agencies are provided appropriate levels of technical support for ongoing operations.
- Coordination and communication of all changes to the project/system to all stakeholders.
- DTMB and client agency managers and staff are educated in and use the State Unified Information Technology environment (SUITE), SEM, Control Objectives for Information Technology (COBIT) and their associated products.
- Projects are resourced correctly with:
  - Project managers commensurate with the project size, complexity and importance.
  - Team members that are skilled or adequately trained in the technologies used.
  - Appropriate tools to complete the assigned tasks.
- Application development standards that maintain data integrity and security are developed, maintained and followed.
- An IT disaster recovery plan – fulfilling the agency funded “recovery time objective” and the “recovery point objectives” – is required, developed and maintained (for more detail see Administrative Guide Policy 1340.00 Information Technology Information Security Policy, Section 070 Contingency Planning (CP) and SOM 1340.00.070.02 Information Technology Continuity of Business Planning Standard).
- All third-party provided IT Resources are managed to afford the SOM the best value for the contractual cost.

## TERMS AND DEFINITIONS

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### **Agency**

The principal department of state government as created by Executive Organization Act, P.A. 380 of 1965.

### **Availability**

Ensuring timely and reliable access to and use of information and assuring that the systems responsible for delivering, storing and processing information are accessible when needed, by those who need them.

### **Business Owner**

The person responsible for administration of systems. A business owner is usually the owner of the primary business functions served by the application or the application’s largest stakeholder.

## **Confidentiality**

Protecting information from unauthorized disclosure or interception and assuring that information is shared only among authorized persons and organizations.

## **Data Custodian**

An individual or organization delegated by a data owner that has responsibility for maintenance and technological management of data and systems.

## **Data/Information**

State of Michigan agency information. No distinctions between the words “data” and “information” are made for purposes of this policy.

## **Data Owner**

An individual or organization – usually a member of senior management of an organization – who is ultimately responsible for ensuring the protection and use of data.

## **Due Care**

Shows that an organization has taken responsibility for the activities that take place within the organization and has taken the necessary steps to help protect the SOM, its resources and employees from possible risk.

## **Due Diligence**

The practice of implementing controls and safeguards that insure protection mechanisms are continually maintained and operational.

## **Full SEM**

State of Michigan Systems Engineering Methodology (SEM) that encompasses seven stages: Initiation/Planning, Requirements Definition, Functional Design, System Design, Construction, Testing, and Implementation.

## **Information Technology (IT)**

Refers to software, hardware, networking, Internet of Things, and telecommunication products and services that the state uses to store, manage, access, communicate, send and receive information. IT also refers to data, voice and video technologies. The determination of whether something falls under IT is not dependent on cost (i.e., could be a free service) or whether the product or service is hosted on state systems.

Examples of IT products or services include, but are not limited to, the following:

- On-premise, commercial-off-the-shelf (COTS) software applications installed on state systems (e.g., Adobe Acrobat).
- Externally hosted, COTS software applications installed on a vendor’s system (e.g., DocuSign, Salesforce, etc.).
- Custom developed software applications (e.g., DHHS’ CHAMPS system).
- Software-as-a-Service (SAAS) applications hosted by a vendor (e.g., LexisNexis, Survey Monkey, etc.).
- Subscription-based information services (e.g., Gongwer, Gartner, etc.).
- Social media accounts (e.g., Twitter, Facebook, etc.).
- Mobile applications (e.g., iTunes).

- Server hardware and software used to support applications such as database, application/web servers, storage systems, and other hosting services (e.g., Dell EMC PowerEdge Blade server).
- Hardware devices (e.g., laptops, tablets, smartphones, etc.).
- Data, voice, and video networks and associated communications equipment and software (e.g., Cisco routers and switches).
- Peripherals directly connected to computer information systems (e.g., Ricoh scan printers, printers).
- Internet of Things (IOT) are objects with electronic components that include processing and networking capabilities designed to enhance the functionality of the object by leveraging communications over the internet (e.g., ADT Security, smart thermostat, software-enabled lab equipment, refrigerator with an LCD screen, etc.).
- Vendor services for software application, installation, configuration, development and maintenance, including staff augmentation arrangements (e.g., CNSI resources assisting with maintenance and support of the DHHS CHAMPS system).

To utilize or source a product or service that includes components that meet the definition of Information Technology, the agency shall engage with the designated General Manager, or Business Relationship Manager for consultation on the need for DTMB IT services, (e.g., Cyber Security, Agency Services, Enterprise Architecture, Telecom, etc.).

### **Integrity**

Guarding against improper information modification and/or destruction, ensuring information has not been altered by unauthorized people and the assurance that the information can be relied upon to be sufficiently accurate for its purpose. Integrity considers all possible causes of modification, including software and hardware failure, environmental events, and human intervention.

### **Methodology**

A system of principles, practices and procedures applied to a specific branch of knowledge. A documented approach for performing activities in a coherent, consistent, accountable and repeatable manner.

### **Process Guide**

Document that provides instruction or guidance on how to adhere to a process.

### **SEM Express**

State of Michigan Systems Engineering Methodology (SEM) tailored for small, straightforward projects that encompass three stages: Initiation/Requirements/Design, Construction/Testing, and Implementation.

### **System Owner**

From an enterprise perspective, the unit that funds and has approval authority for a project. From an application perspective, individual(s) that has ultimate responsibility for a system and is responsible for gathering information and providing management recommendations on the resources required to meet operational objectives.

## Template

Templates establish the initial document setting and formats. A word processing program like Microsoft Word uses the “normal” template as the basis for all documents. A user can modify the “normal” document and/or create other templates to use.

## Trusted Partner/ Business Partner

A person (i.e., vendor, contractor, third party, etc.) or entity that has contracted with the SOM to perform a certain service or provide a certain product in exchange for valuable consideration, monetary, or goods and services.

## AUTHORIZATION

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### Authority

This policy obtains its authority from:

- Administrative Guide [Policy 1305 Enterprise Information Technology](http://www.michigan.gov/documents/dmb/1305_193158_7.pdf) ([http://www.michigan.gov/documents/dmb/1305\\_193158\\_7.pdf](http://www.michigan.gov/documents/dmb/1305_193158_7.pdf)).
- The [Administrative Guide to State Government](http://www.michigan.gov/dtmb/0,5552,7-150-9131_9347---,00.html) ([http://www.michigan.gov/dtmb/0,5552,7-150-9131\\_9347---,00.html](http://www.michigan.gov/dtmb/0,5552,7-150-9131_9347---,00.html)).
- DTMB [IT Technical Policies, Standards and Procedures](https://stateofmichigan.sharepoint.com/teams/insidemi/Pages/For%20Your%20Job/In%20the%20Office/IT_PSP.aspx) ([https://stateofmichigan.sharepoint.com/teams/insidemi/Pages/For%20Your%20Job/In%20the%20Office/IT\\_PSP.aspx](https://stateofmichigan.sharepoint.com/teams/insidemi/Pages/For%20Your%20Job/In%20the%20Office/IT_PSP.aspx)), which can be found on the DTMB Intranet.

### Enforcement

All enforcement for this policy shall be in compliance with the standards and procedures of Administrative Guide [Policy 1305 Enterprise Information Technology](http://www.michigan.gov/documents/dmb/1305_193158_7.pdf) ([http://www.michigan.gov/documents/dmb/1305\\_193158\\_7.pdf](http://www.michigan.gov/documents/dmb/1305_193158_7.pdf)).

### Developing Standards and Procedures for this Policy

All requirements for developing standards and procedures for this policy shall be in compliance with Administrative Guide [Policy 1305 Enterprise Information Technology](http://www.michigan.gov/documents/dmb/1305_193158_7.pdf) ([http://www.michigan.gov/documents/dmb/1305\\_193158\\_7.pdf](http://www.michigan.gov/documents/dmb/1305_193158_7.pdf)).

### Exceptions

All exception requests to this policy must be processed in compliance with Administrative Guide [Policy 1305 Enterprise Information Technology](http://www.michigan.gov/documents/dmb/1305_193158_7.pdf) ([http://www.michigan.gov/documents/dmb/1305\\_193158\\_7.pdf](http://www.michigan.gov/documents/dmb/1305_193158_7.pdf)).

### Effective Date

This policy will be effective upon signature of the Administrative Guide approval memo by the DTMB Director.

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